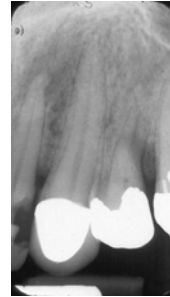


Image Characteristics and Principle of Image Casting

Ghaida' AlJamal, BDS, MS, Dip. ABOMR
Associate Professor of Oral Radiology

1

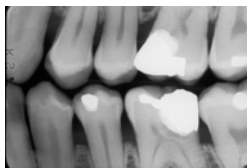
Image Characteristics



2

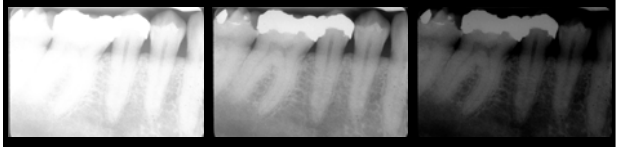
Density

Represents the degree of darkening of an exposed x-ray film (white to black)



3

The overall density of the film affects the diagnostic value of the film (ideal density, too light, too dark)



4

Density influenced by:

1. Exposure factors
2. Patient size
3. Object density
4. Film fog

5

Exposure factors (mA, kVp, exposure time). An unnecessary increase in any of these factors results in an increase in film density.

Patient size: the larger the patient's head, the more x-rays that are needed to produce an ideal film density

6

Object Density vs. Film Density

Object density: determined by type of material (metal, tooth structure, composite, etc.) and by amount of material

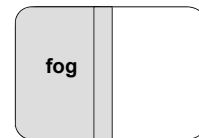


Film density: how light or dark are the different parts of the film. Film density (darkness) decreases when object density increases

7

Film Fog

Increased film density from causes other than exposure to the primary x-ray beam (scatter, improper safelighting, improper film storage, expired film)

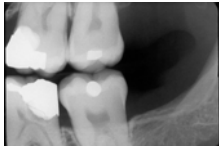


8

RADIOLUCENT

Dark Gray to Black

Low object density results in high film density (e.g., air, soft tissue)



9

RADIOPAQUE

White to Light Gray

High object density results in low film density (e.g., amalgam, tooth structure, bone)



10

Contrast

The difference in densities between various regions on a radiograph

11

High Contrast

Short Scale

Black and White
(Few shades of gray)

Best for caries detection

12

Low Contrast

Long Scale

Many shades of gray

Best for periapical or periodontal evaluation

13

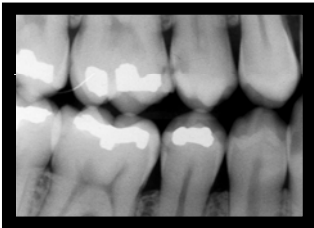
Contrast influenced by:

1. Subject contrast
2. kVp
3. Film contrast
4. Fog

14

Subject contrast

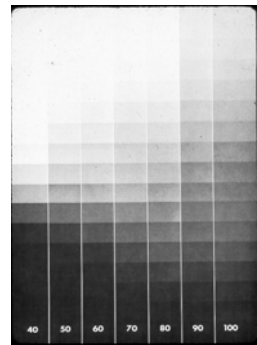
Results from varying object densities within patient



15

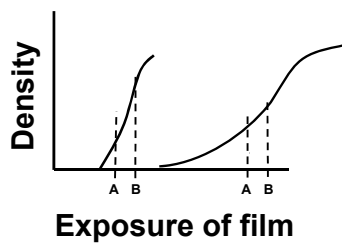
kVp

Affects energy (penetrating ability) of x-rays.



16

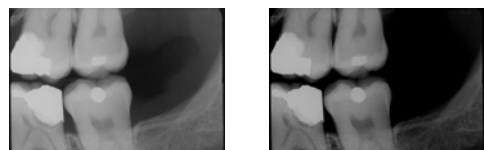
Film contrast: incorporated into film by manufacturer.



17

Film Fog

Film fog makes the whole film darker, making it harder to see the density differences (contrast)



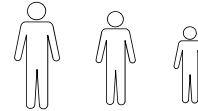
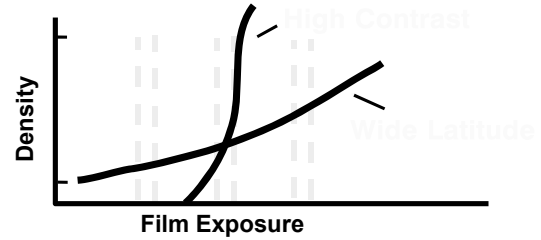
18

Latitude

Represents the range of exposure that will produce diagnostically acceptable densities on a film.

Increase latitude, decrease contrast

19



20

Speed

Represents the amount of radiation required to produce a radiograph of acceptable density. The higher the speed, the less radiation needed to properly expose the film.

(Larger crystals = increased speed)

21

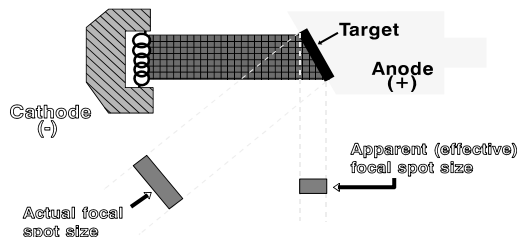


Principles of Shadow Casting

1. Radiation source small as possible
2. Source-object distance large
3. Object-film distance small
4. Object and film parallel
5. X-ray beam perpendicular to object/film

22

Radiation source as small as possible

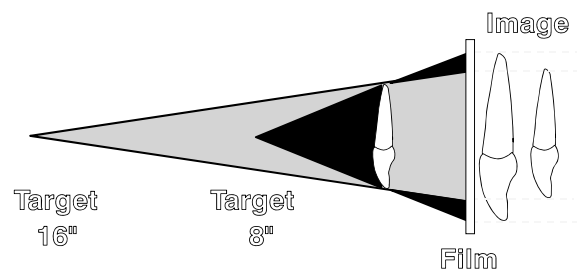


Line Focus Principle

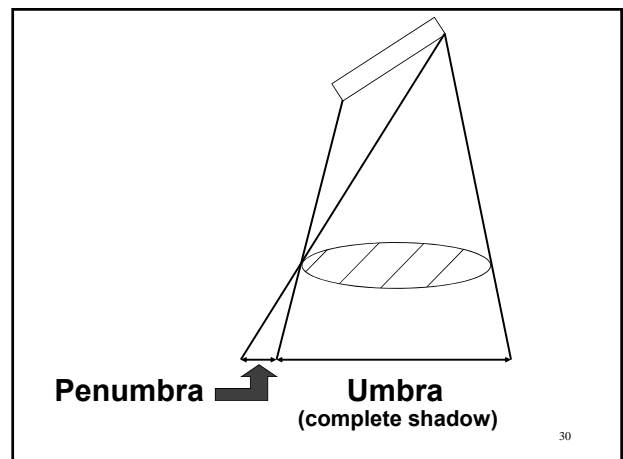
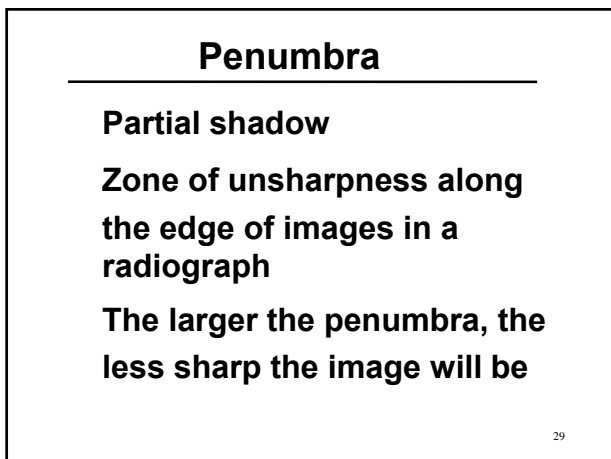
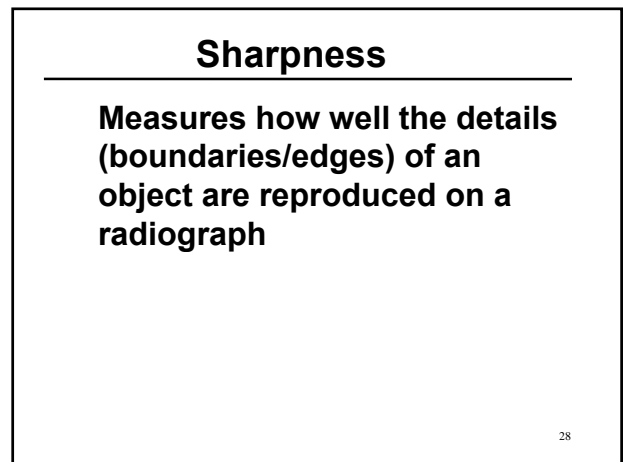
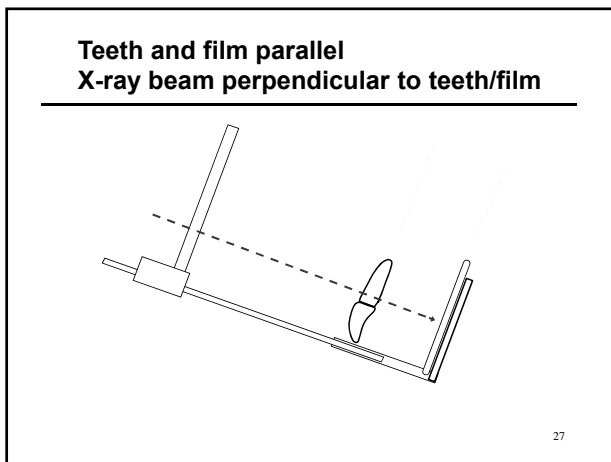
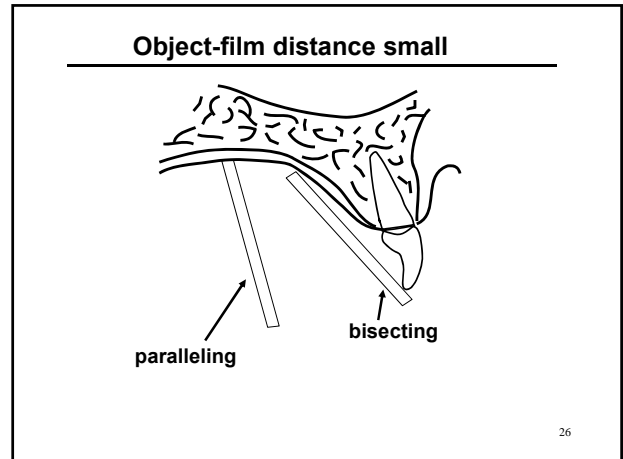
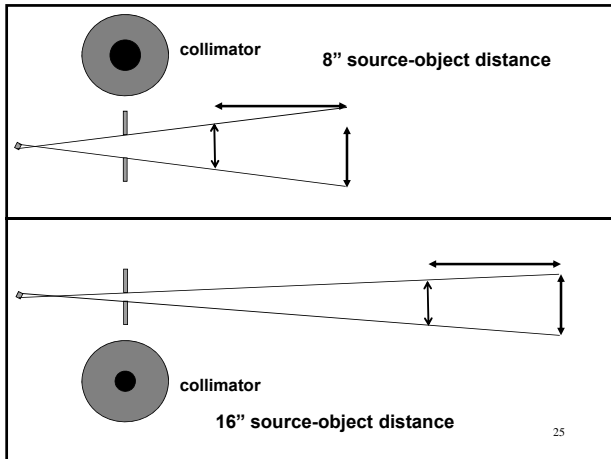
Source = target = focal spot = focus

23

Source-object distance large



24

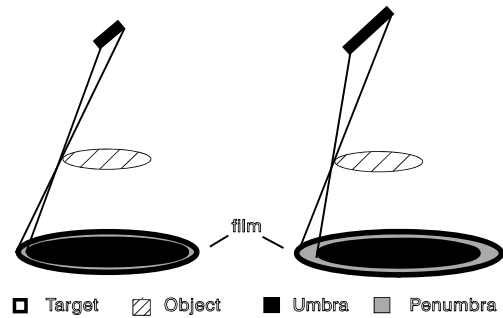


Sharpness influenced by:

1. Focal spot size
2. Source-object (teeth) distance
3. Object (teeth)-film distance
4. Intensifying screens
5. Film crystal size
6. Motion

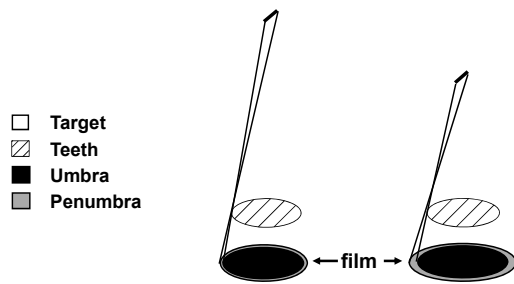
31

Decrease focal spot size, increase sharpness

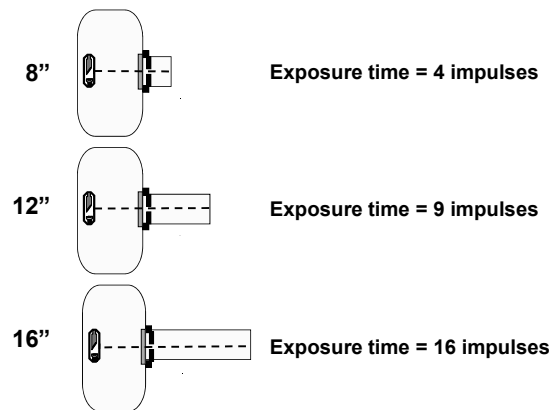


32

Increase source-object distance, increase sharpness

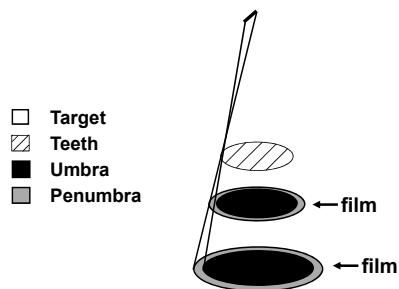


33



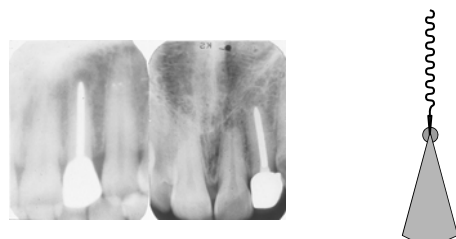
34

Decrease object-film distance, increase sharpness

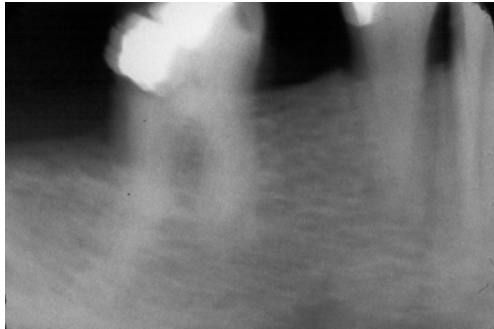


35

Intensifying screens decrease sharpness



Patient motion decreases sharpness



37

Magnification

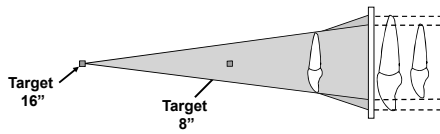
Increase in size

Magnification affected by:
Source-object distance
Object-film distance

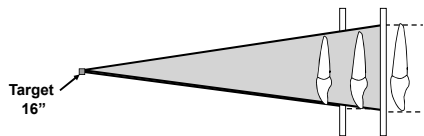
38

Magnification

Increase source-object distance, decrease magnification



Decrease object-film distance, decrease magnification



39

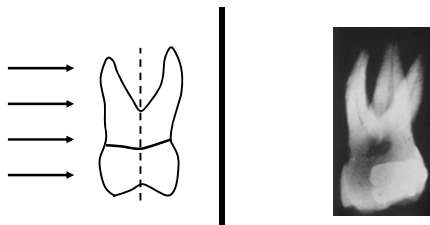
Distortion

Change in shape or relationship

Distortion affected by:

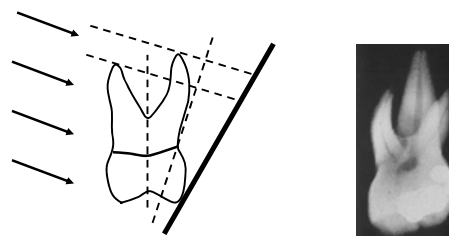
1. Film-teeth relationship || |
2. Beam alignment → | ↘

40



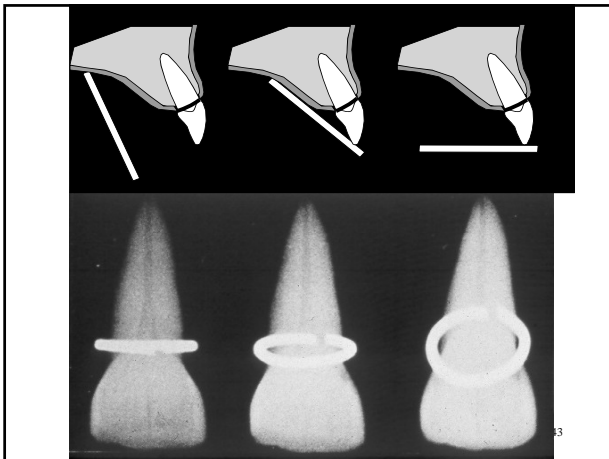
Paralleling

41



Bisecting angle

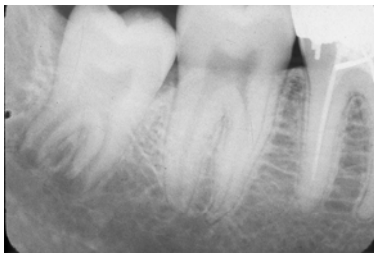
42



Ideal Radiograph

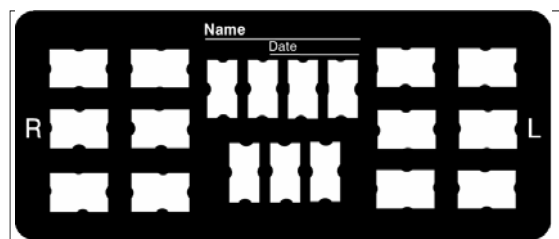
1. Image same size as object
2. Image same shape as object
3. Image has good detail
4. Image has good density and contrast

44



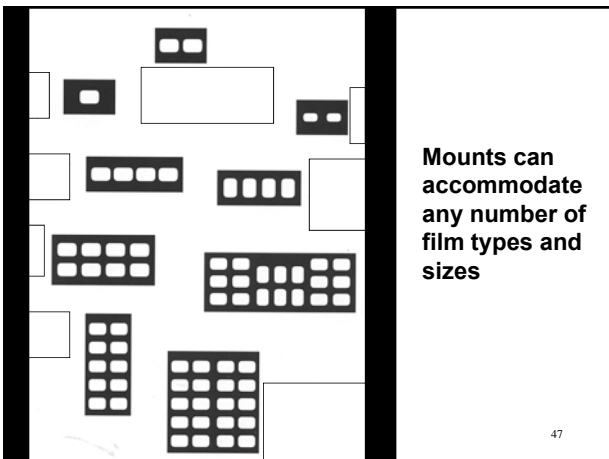
Mandibular molar periapical film comes closest to satisfying properties of an ideal radiograph (either paralleling or bisecting)

45



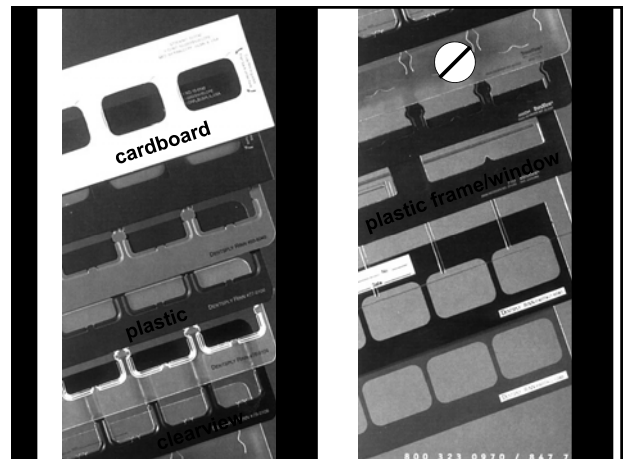
Film Mounting

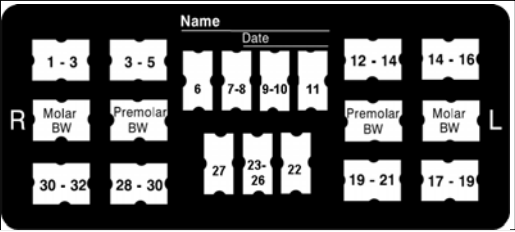
46



Mounts can accommodate any number of film types and sizes

47





Name _____ Date _____

1 - 3 3 - 5 6 7-8 9-10 11 12 - 14 14 - 16

R Molar BW Premolar BW Premolar BW Molar BW L

30 - 32 28 - 30 27 23 - 26 22 19 - 21 17 - 19

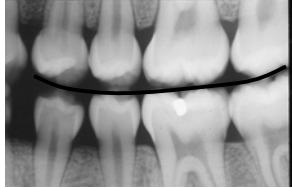
Maxillary films in top row
Bitewing films in middle row
Mandibular films in bottom row
Films of patient's right go in left side of mount, as if you are looking at the patient

49

raised dot →

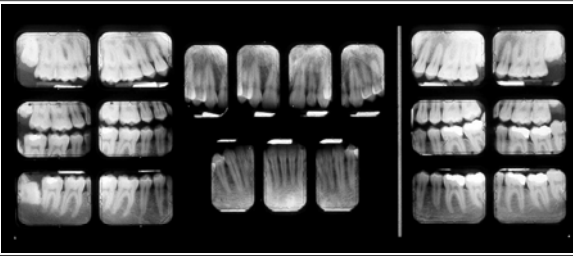
faces observer

film →




Curve of Spee directed upward

50

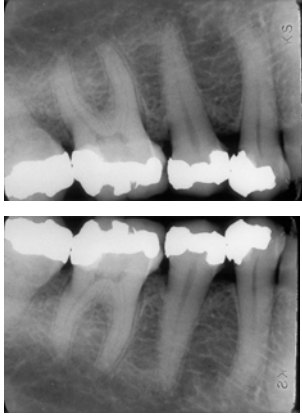


Mount bitewings first
Anatomical landmarks will help to identify area of mouth
Tooth size and number of roots will also help in identifying teeth on radiograph
Label mount with patient's name and date

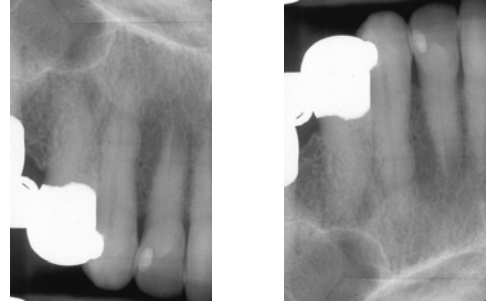
51



52



53



54

